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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/712,005
Filing Date: November 14, 2003
Appellant(s): SPANKE, DIETMAR

____
Felix J. D'Ambrosio Reg. No. 25,721
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 11, 2008 appealing from the Office action mailed March 24, 2006, Reply Brief filed December 30, 2008, and Remand

mailed on February 27, 2009. The Examiner answer mailed on October 30, 2008 is hereby vacated.

The reply brief filed December 30, 2008 has been entered and considered. The application has been forwarded to the Board of Patent Appeals and Interferences for decision on the appeal. Similar arguments have been previously addressed.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

The first ground of rejection 1) under 35 USC 102(a) includes claim 65. However, claim 65 has been cancelled as mentioned in section (III-status of claims) of the APPEAL. Therefore, claim 65 is not part of the appealed claims.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner.

1) Claims 14, 15, 21, 28 - 32, 34, 35, 47 - 55, and 62 finally rejected under 35 USC 102(a) as being anticipated by Lalla et al.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 5,614,911	**Otto et al.**	**03-1997**
US 6,169,706 B1	**Woodward et al.**	**01-2001**
US 6,087,978 A	**Lalla et al.**	**07-2000**
DE 44 07 369 A1	**Josef Fehrenbach et al.**	**09-1995**

(9) Grounds of Rejection

As mentioned above the following rejection has been withdrawn:

1) Claims 14, 15, 21, 28 - 32, 34, 35, 47 - 55, and 62 finally rejected under 35 USC 102(a) as being anticipated by Lalla et al.

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-16, 20-21, 28-36, 47-58, and 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto et al. (911) in view of Woodward et al. and Lalla et al. US006087978A.

Referring to claims 14, 29-32 and 62, Otto discloses in figures 1 and 2 a level measuring device operating transmit signal (S_2) and receive signal (E_2), a control unit with a volatile data memory 50 for storing a sampling sequence currently representing intermediate-frequency signal (see col.1 lines 52- with microwaves (see Abstract), a transmission circuit 16 and a reception circuit 20, which reads on the claimed a transceiver unit for generating an intermediate-frequency signal by means of 57 (see col. 5 lines 50-57). Although Otto does mention an "intermediate-frequency signal" in

the specification, the output signal of the mixer 38 to the A/D converter 46 is inherently an intermediate-frequency (digital), which is equivalent to the claimed intermediate-frequency signal (ZF). Otto teaches transmitting a signal into a vessel, and detecting the reflected signal, Otto does not teach a transducer element (1), which couples transmitted waves into the vessel under control of the transmit signal (S_2) and convert the reflected waves into the receive signal (E_2), Woodward teaches using a transducer element 2 coupled to the transceiver for transmitting waves into the vessel under control of the signal from the transceiver, and convert the reflected waves into receive signal to the transceiver (see Figure 1, Abstract). It would have been obvious to modify Otto's system to include a transducer for a better range and because it is known and only requires the knowledge of one skilled in the art.

Otto is silent about the repetition-rate, the transmitted and the IF center frequencies. Lalla teaches a similar system including repetition rate of several MHz, a transmitting frequency of several GHz, and IF frequency below 100 Khz (see col. 5 lines 41-51). Which reads on the claimed repetition rate above 1 MHz, center frequency of transmit signal above 0.5 GHz, and center frequency of IF above 50 KHz. It would have been obvious to modify Otto to include the frequencies of Lalla for more accurate measurements with less signal-to-noise ratio.

Referring to claims 15-16, Otto discloses in figures 1 and 2 a level measuring device, which determines the level by means of amplitude information and phase information derived from the sampling sequence (see col. 4 lines 10-20, col. 5 lines 27-37).

Referring to claim 20, Otto discloses in figure 1 a control unit with a volatile data memory 50 for storing a digital phase sequence from the output of the A/D converter 46, which represents a normalization of the intermediate-frequency signal to an amplitude variation of the intermediate frequency signals (see col. 1 lines 52-57, col. 5 lines 10-37 and 50-57), which also inherently correspond to phase variation of the intermediate frequency signal (see col. 4 lines 10-16, col. 5 lines 38-43).

Referring to claim 21, Otto teaches storing a digital envelope, which represents an amplitude variation of the intermediate-frequency signal (see col. 5 lines 27-52).

Referring to claims 33 and 50, Otto discloses in figures 1 and 2 an amplifier 40 and a logarithmizing unit 42, which reads on the claimed logarithmic amplifier for the intermediate-frequency signal (see col. 5 lines 20-27).

Referring to claims 28 and 48, Woodward teaches using a transducer element 2 coupled to the transceiver for transmitting waves into the vessel under control of the signal from the transceiver, and convert the reflected waves into receive signal to the transceiver (see Figure 1, Abstract). It would have been obvious to modify Otto's system to include a transducer for a better range and because it is known and only requires the knowledge of one skilled in the art.

Referring to claims 34, 49, 51-54, Otto discloses in figures 1 and 2 a level measuring device operating with microwaves (see Abstract), a transmission circuit 16 and a reception circuit 20, which reads on the claimed a transceiver unit for generating an intermediate-frequency signal by means of transmit signal (S_2) and receive signal (E_2), a control unit with a volatile data memory 50 for storing a sampling sequence

currently representing intermediate-frequency signal (see col.1 lines 52-57, col. 5 lines 50-57). Although Otto does not talk about intermediate-frequency signal in the specification, the output signal of the A/D converter 46 is an intermediate-frequency, which is equivalent to the claimed intermediate-frequency signal (ZF). Otto teaches transmitting a signal into a vessel, and detecting the reflected signal, Otto does not teach a transducer element (1), which couples transmitted waves into the vessel under control of the transmit signal (S_2) and convert the reflected waves into the receive signal (E_2), Woodward teaches using a transducer element 2 coupled to the transceiver for transmitting waves into the vessel under control of the signal from the transceiver, and convert the reflected waves into receive signal to the transceiver (see Figure 1, Abstract). It would have been obvious to modify Otto's system to include a transducer for a better range and because it is known and only requires the knowledge of one skilled in the art.

Otto does is silent about the repetition rate, transmitted and IF center frequencies. Lalla teaches a similar system including repetition rate of several MHz, transmitting frequency of several GHz, and IF frequency below 100 Khz (see col. 5 lines 41-51). Which reads on the claimed repetition rate above 1MHz, center frequency of transmit signal above 0.5 GHz, and center frequency of IF above 50 KHz. It would have been obvious to modify Otto to include the frequencies of Lalla for more accurate measurements with less signal-to-noise ratio.

Referring to claims 35 and 36, Otto discloses in figures 1 and 2 a level measuring device, which determines the level by means of amplitude information and

phase information derived from the sampling sequence (see col. 4 lines 10-20, col. 5 lines 27-37).

Referring to claim 47, Otto teaches storing a digital echo function (see col. 52-57) which reads on the claimed digital envelope as admitted by the applicant (see applicant's amendment page 10 lines 3-7). Furthermore, it's inherent that the stored digital data represent a temporal amplitude variation of the intermediate-frequency signal.

Referring to claims 50, 55, Otto discloses in figure 2 a logarithmic amplifier 42 and 40, for the intermediate frequency from mixer 38, the logarithmic amplifier is coupled to the analog-to-digital converter 46.

Referring to claim 61, The combination of Otto et al. and Woodward are silent about having a communication unit for sending measuring data to a remote area. However, transmitting the measurement data to a different location (station) is widely used for many different systems, where frequent automatic readings (measurements) are taken; therefore, official notice taken that communicating the measurement data to a remote station is well known, and is obvious to include for convenient and for frequent measurements.

Referring to claims 56, Otto discloses in figures 1 and 2 a level measuring device operating with microwaves (see Abstract), a transmission circuit 16 and a reception circuit 20, which reads on the claimed a transceiver unit for generating an intermediate-frequency signal by means of transmit signal (S_2) and receive signal (E_2), a control unit with a volatile data memory 50 for storing a sampling sequence currently

representing intermediate-frequency signal (see col.1 lines 52-57, col. 5 lines 50-57). Although Otto does not talk about intermediate-frequency signal in the specification, the output signal of the mixer 38 to the A/D converter 46 is an intermediate-frequency, which is equivalent to the claimed intermediate-frequency signal (ZF), the control unit 50 inherently has a digital level, it is coupled to the A/D converter that provide digital intermediate-frequency signal. Otto teaches transmitting a signal into a vessel, and detecting the reflected signal, Otto does not teach a transducer element (1), which couples transmitted waves into the vessel under control of the transmit signal (S_2) and convert the reflected waves into the receive signal (E_2), Woodward teaches using a transducer element 2 coupled to the transceiver for transmitting waves into the vessel under control of the signal from the transceiver, and convert the reflected waves into receive signal to the transceiver (see Figure 1, Abstract). It would have been obvious to modify Otto's system to include a transducer for a better range and because it is known and only requires the knowledge of one skilled in the art.

Otto does is silent about the repetition rate, transmitted and IF center frequencies. Lalla teaches a similar system including repetition rate of several MHz, transmitting frequency of several GHz, and IF frequency below 100 Khz (see col. 5 lines 41-51). Which reads on the claimed repetition rate above 1MHz, center frequency of transmit signal above 0.5 GHz, and center frequency of IF above 50 KHz. It would have been obvious to modify Otto to include the frequencies of Lalla for more accurate measurements with less signal-to-noise ratio.

Referring to claim 57, as mentioned above Otto teaches a control unit with a volatile data memory 50 for storing a sampling sequence currently representing intermediate-frequency signal (see col.1 lines 52-57, col. 5 lines 50-57). Furthermore, the memory in the computer is finite which reads on a finite sampling sequence currently representing the intermediate-frequency signal.

Referring to claim 58, Otto discloses in figure 2 a logarithmic amplifier 42 and 40, for the intermediate frequency from mixer 38, the logarithmic amplifier is coupled to the analog-to-digital converter 46.

Claims 17-19, 24-26, 37-41, 45-46, 63, 72, 74-78, and 81-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otto et al. (911) in view of Woodward et al. and Lalla et al. US006087978A and Josef Fehrenbach et al. (DE 44 07 369 A1).

Referring to claims 17 and 24, Otto teaches several echo functions in sequence may be stored in the RAM of the computer, it would be obvious if not inherent that the functions must be of digital sine-wave signals and/or cosine-wave signals by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences (see col. 5 lines 50-57). Furthermore, Josef teaches signal sequences SIN_{AF} first signal sequence and COS_{AF} second signal sequence (see applicant's specification regarding DE 4407369A1 page 17 lines 5-11). It would have been obvious to modify the combination of Otto and Woodward to further include storing signal sequence SIN_{AF} and

COS_{AF} by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences to achieve more accurate results and better probability.

Referring to claims 18, 25-26, the combination of Otto and Woodward does not teach a first quadrature-signal sequence (Q) represents a numerically performed downconversion of (SIN_{AF}) and/or a second quadrature-signal sequence (I) represents a numerically performed downconversion of COS_{AF}. Josef teaches digital quadrature-signal sequences Q, I, signals sequences SIN_{AF} COS_{AF}, which can be converted, according to the well-known trigometric relationship, into a corresponding amplitude or phase value, which reads on the claimed first quadrature-signal sequence (Q) represents a numerically performed downconversion of SIN_{AF} and a second quadrature-signal sequence (I) represents a numerically performed downconversion of COS_{AF} (see applicant's specification regarding DE 4407369A1 page 17 lines 5-11). It would have been obvious to modify the combination of Otto and Woodward to further include storing the quadrature-signals (Q) and/or (I) to achieve more accurate results and better signal evaluation.

Referring to claim 19, as mentioned above the combination of Otto, Woodward, and Josef teaches generating the first quadrature-signal sequence, which is inherently based on an average-value sequence held in the memory. Even if it is not inherent it would be obvious to take the average-value sequence to generate the first quadrature-signal sequence because of possible errors, taking the average will reduce error in the calculation.

Referring to claims 37 and 38, Otto teaches several echo functions in sequence may be stored in the RAM of the computer, it is obvious that the functions must be of digital sine-wave signals and/or cosine-wave signals by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences (see col. 5 lines 50-57). Furthermore, Josef teaches signal sequences SIN_{AF} first signal sequence and COS_{AF} second signal sequence (see applicant's specification regarding DE 4407369A1 page 17 lines 5-11). It would have been obvious to modify the combination of Otto and Woodward to further include storing signal sequence SIN_{AF} and COS_{AF} by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences to achieve more accurate results and better probability.

Referring to claims 39 and 40-41, 63, 72, 74-78 and 81-82, the combination of Otto and Woodward does not teach a first quadrature-signal sequence (Q) represents a numerically performed downconversion of (SIN_{AF}) and/or a second quadrature-signal sequence (I) represents a numerically performed downconversion of COS_{AF}, Josef teaches digital quadrature-signal sequences Q, I, signals sequences SIN_{AF} COS_{AF}, which can be converted, according to the well-known trigonometric relationship, into a corresponding amplitude or phase value, which reads on the claimed first quadrature-signal sequence (Q) represents a numerically performed downconversion of SIN_{AF} and a second quadrature-signal sequence (I) represents a numerically performed downconversion of COS_{AF} (see applicant's specification regarding DE 4407369A1 page 17 lines 5-11). It would have been obvious to modify the combination of Otto and

Woodward to further include storing the quadrature-signals (Q) and/or (I) to achieve more accurate results and better signal evaluation.

Referring to claims 45 and 46, Otto teaches several echo functions in sequence may be stored in the RAM of the computer, it is obvious that the functions must be of digital sine-wave signals and/or cosine-wave signals by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences (see col. 5 lines 50-57). Furthermore, Josef teaches a digital signal sequences that include phase and amplitude, which reads on the claimed SIN_{AF} first digital phase sequence and COS_{AF} second digital phase sequence (see applicant's specification regarding DE 4407369A1 page 17 lines 5-11). It would have been obvious to modify the combination of Otto and Woodward to further include storing signal sequence SIN_{AF} and COS_{AF} by multiplying the signal sequence by digital sin-wave or cos-wave signal sequences to achieve more accurate results and better probability. Furthermore, it is inherent that both first and second phase variation correspond to temporal phase variation of the intermediate frequency signal.

(10) Response to Argument

(1)

Applicant's argument that claims 14, 15, 21, 28 - 32, 34, 35, 47 - 55, 62 and 65 are not anticipated by Lalla et al under 35 USC 102(a) has been considered and found persuasive. Therefore, the rejections have been withdrawn.

(2)

Applicant argues that claims 14 - 16, 20, 21, 28 - 36, 47 - 58, 61 and 62 are not rendered unpatentable under 35 USC 103(a) over Otto et al in view of Woodward et al and Lalla et al.

Applicant argues that "Neither Lalla et al, Woodward et al nor Otto et al teach a volatile memory (RAM) for storing a digitized intermediate frequency signal or a finite sampling sequence of the intermediate frequency signal having an intermediate frequency range above 50kHz" (page 11:1-4) and "Otto et al also does not disclose or suggest the use of a digitized intermediate frequency signal" (page 11:16-17).

In response: Examiner respectively disagrees. First, it is clear that Otto teaches a controller (50) which has a RAM for the storing the detected data which reads on the claimed volatile data memory. (see Otto col. 5:38-41, and figure 2, "In performing a level measurements the digital code groups furnished in sequence by the analog-to-digital converter 46 in the course of a reception phase are entered into a computer 50 and stored in a RAM of the computer").

Second, it appears that the applicant does not agree that the output of the mixer (reference 38 in figure 2 of Otto) is an Intermediate Frequency (IF signal); therefore, here is the definition of an IF signal according to Glossary of Meteorology (*http://amsglossary.allenpress.com/glossary/search?p=1&query=IF+signal*)

[IF signal—(Abbreviation for intermediate frequency signal.)

The signal at an intermediate stage of radar and lidar receivers,

chosen at a standard frequency (often 30 or 60 MHz) where amplifiers and filters are commonly available.

The radar or lidar echoes are converted to IF signals by a mixer, which shifts the frequency of the signals through the use of a local oscillator. Information is extracted from IF signals by detection or coherent detection.]

Therefore, it is clear from the definition above, the mixer (38) generates the claimed intermediate frequency signal so it can be filtered and amplified as part of very known signal processing technique.

Third, regarding the argument that Otto does not store a digitized intermediate frequency. Going back to figure 2, which clearly shows the claimed IF signal from the mixer (38), which then goes through the signal processing stages filter (39), amplifier (4), logarithmizing (42), sampling circuit (44), and finally to an Analog-to-Digital Converter, which convert the signal to a digitized form before it is stored in the RAM of the controller (50). Therefore, as explained above, Otto clearly teaches using and storing a digitized intermediate frequency signal.

Applicant argues that Lalla teaches a system that “only the analogue envelop signal is available at the input of the first subcircuit 27 (= sample & hold circuit 29 and AND converter 31), but not an analogue intermediate frequency signal having intermediate frequency above 50 kHz” (page 11 lines 8-13). In response: Lalla teaches “the frequency of the intermediate frequency signal is below 100 kHz” (col. 5:44-45) which reads on the claimed “above 50 kHz”. Further, applicant is arguing for limitations

that are not in the claims, the "analogue intermediate frequency". Therefore, even if the Lalla's system stores the envelope signals of the intermediate frequency it still reads on the broad interpretation of the claims.

(3)

Applicant argues that claims 17-19, 24-26, 37-41, 45, 46, 63, 72, 74-78, 81 and 82 are not rendered unpatentable under 35 USC 103(a) over Otto et al in view of Woodward et al, Lalla et al and Fehrenbach et al.

Applicant states that the argument mentioned in section (2) applies here as well and that "The disadvantage of the device disclosed in Fehrenbach et al, and noted in this application, is not, it is respectfully submitted, cured by its combination with Otto et al, Woodward et al and Lalla et al. It simply does not provide the accuracy needed" (page 12).

In response: Examiner respectively disagrees; the same examiner response for section (2) above applies here as well. Further, In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant states that "It simply does not provide the accuracy needed". Otto teaches that several echo functions may be stored in RAM (col. 5:50-52),

Otto does not specifically teaches the functions being sine wave or cosine wave. However, as mentioned in the office action Fehrenbach teaches the claimed functions, and therefore are obvious. The combination would provide better accuracy in term of data storage and processing.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Isam Alsomiri/

Primary Examiner, Art Unit 3662

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